REMARKS

The Office Action, mailed September 2, 2008, has been received and its contents carefully noted. The then pending claims, claims 1-7 and 9-12 were rejected. By this Response, claims 1 and 10 have been amended. Support may be found in the specification and the claims as originally filed. See, for example, the disclosure on pages 11 and 12 of the present application including page 12, lines 13-18, of the original specification as filed. No statutory new matter has been added. Therefore, reconsideration and entry of the claims, as amended, are respectfully requested.

Rejections under 35 U.S.C. 102(b)/103(a)

The Examiner rejected claims 1-7 and 9-12 under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Suzuki (JP 2001144019). Specifically, the Examiner deemed that Suzuki discloses the claimed invention in Figures 1-23 and the corresponding text. Alternatively, the Examiner deemed that it would have been obvious that the determination of recipe modification depends upon previous experimentation. The Examiner also rejected the claims under 35 U.S.C. 103(a) as being unpatentable over Suzuki I (JP 2001144019) in view of Suzuki II (US 20020014483). Specifically, the Examiner deemed that it would have been obvious to have substrate arrangement as a process parameter for a variable number of substrates in order to get uniform process results.

Applicants respectfully submit that, as seen from the explanation below, the cited references do not teach or suggest the claimed arrangement of independent claims 1 and 10.

It is respectfully submitted that the general reference to process conditions for the controller (e.g., mere reference to controlling process parameters such as process pressure, treatment temperature and gas mass flow) in Suzuki I and Suzuki II fail to disclose or suggest a thermal processing unit featuring the coordination of process gas parameters and temperature data utilized in fine tuning the uniformity of film forming speed amongst a plurality of different size batch processes. In the Office Action remarks there is indicated that the Applicants' interpretation of the term "speed of the film forming process" is not understood and that the deposition rate is a process result and good processing requires it be uniform across different batches as disclosed. As a clarification and/or correction to the earlier discussion, Applicants

note that a feature of the present application is the achievement of a relatively uniform film forming speed from batch to batch despite differences in batch make up. As noted by the Examiner, an example of providing relatively uniform film forming speeds despite differences in batch number is illustrated in Figure 4 of the present application. As seen in that Figure 4 example, gas flow parameters (e.g., gas flow rate) are correlated in that example with the batch size number with the focus of obtaining relatively uniform film forming speeds despite batch size differences from batch to batch (noting the potential of different batch sizes to influence different film forming speeds if the flow rate parameter of the process gas were not utilized in an effort to seek to compensate in accordance with the disclosed invention). Thus, under that example, there is described the feature of seeking relatively uniform film forming speed during a course of thermal processing for a batch among a plurality of batch-processes in which the number of substrates to be processed are different from one each other.

Further, as explained, for example, in the disclosure on pages 11 and 12 of the present application, the potential of coordinated temperature target value(s) usage relative to the gas flow parameter adjustments provides for the ability under the noted claimed invention to provide highly uniform film formation speeds (and the associated high quality output) despite variations in batch process characteristics in a manner not appreciated in the prior art. For instance, with such a coordination of temperature target value usage with the gas flow parameters, there can be achieved highly uniform film formation speeds even in those instances where, due to batch characteristics, there is the potential to still experience problems in uniform film forming speed despite flow parameter adjustments from batch to batch (e.g., difficulty in maintaining a level of uniformity of not more than 0.05 nm/min between minimum and maximum values of the film forming speeds across a plurality of batches with the flow variations parameters alone– with the 0.05 nm/min value having been developed by the inventors as a dispersion limit that provides a high comfort level that the resultant film formation characteristic generated by the thermal processing system will be of high quality).

For further illustration, as set forth in the paragraph bridging pages 11 and 12 (each quote referenced below being presented merely as a non-limited exemplary embodiment for discussion purposes):

> *In the present invention, as described above, the film-forming speeds among the respective batch processes may be made uniform by conducting the thermal processes according to the flow rates set for the respective batch sizes. However, if some dispersion remains in the film-forming speeds, depending on the batch size, it is preferable to change the temperature target-values finely. Then, in this example, a second storing part 76 that stores relational data of batch sizes and temperatures is provided in the controlling part 7. The relational data of batch sizes and temperatures are data associating the batch sizes with the temperature target-values of the respective zones 1 to 5 in the reaction container.*

Moreover, as further described on page 12, lines 9 to 18:

> *For example, when a thermal process temperature of the wafers W (process temperature) is set, a temperature of a product wafer located at a central position among product wafers is controlled to the thermal process temperature. In the embodiment wherein the film-forming speeds are uniform among the different batch sizes, the temperature target value for the central wafer among the wafers is not changed, but other temperature target values for the upper and lower zones are changed finely. In other words, a temperature gradient is finely adjusted.*

And as further described on page 12, lines 23 to 35:

> *However, the present invention doesn't have to adjust the temperature target-values for the respective zones 1 to 5 among the batch sizes, that is, doesn't have to use the relational data of batch sizes and temperatures, if uniformity of the film-forming speeds can be secured by adjusting the flow rates among the respective batch sizes. Alternatively, the relational data of batch sizes and temperatures don't have to be made for each of all the batch sizes. For example, the temperature target values for the respective zones 1 to 5 for only specific batch sizes, for example for only the above seven batch sizes, may be written. In the case, the temperature target values for the respective zones 1 to 5 for the other batch sizes may be obtained by interpolating the written data.*

Thus, it can be seen by the above discussion that the present application describes various arrangements wherein the implemented flow rate parameters are potentially coupled with

temperature target value manipulations which can be implemented based on process conditions that are present or deemed to be potentially present. This includes for example, the arrangement of present claim 1 and 10 which feature the following feature which provides for an advantageous (not appreciated in the prior art) coordination of process gas parameters and temperature data utilized in fine tuning the uniformity of film forming speed particularly for situations where the flow parameter manipulation directed at the film formation speed uniformity levels can be improved upon in conjunction with an efficient implementation of controller processing requirements:

> *wherein the controlling unit further obtains a temperature target value for a central substrate among a plurality of substrates in each batch of said plurality of batch-processes as well as other temperature target values for upper and lower positioned substrates for at least some batches in said plurality of batch-processes, and wherein the obtained temperature value for the central substrate is not changed in value relative to the plurality of batch-processes, but other temperature target values among the upper and lower positioned substrates are changed in value from batch to batch among the batch processes in order to make more uniform the film-forming speed.*

Applicants note that a review of the only general controller processing discussion in Suzuki I and Suzuki II reveals that those references fail to teach or suggest the coordination of flow processing parameters in conjunction with setting a non-changed temperature target value for the central substrate among the substrates with temperature target values for the upper and lower zones being more finely changed to achieve a highly uniform film speed rate across a variety of batch process characteristics (e.g., an efficient usage of controller processing features while still providing a highly uniform film formation speed from batch to batch).

Therefore, Applicants respectfully urge that the claims, as amended, are novel and unobvious and the rejections under 35 U.S.C. 102(b) and 103(a) should be withdrawn.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Therefore, it is respectfully requested that the Examiner reconsider all presently

outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

A one-month extension of time and requisite fee is attached herewith. Please charge any additional fees or any overpayment to **Deposit Account No. 02-4300, Attorney Docket No. 033082R251**.

Respectfully submitted,
SMITH, GAMBRELL & RUSSELL, LLP

Dennis C. Rodgers, Reg. No. 32,936
1130 Connecticut Ave., NW, #1130
Washington, D.C. 20036
Telephone: (202) 263-4300
Facsimile: (202) 263-4329

Dated: December 15, 2008